

What is claimed is:

1. A method for generating patterned features on a substrate that comprises:

forming a first layer on at least a portion of a surface of the substrate, the first layer comprising at least one layer of a first material, which one layer abuts the surface of the substrate;

forming a second layer of a second material on at least a portion of the first layer, which second layer is imprinted with the patterned features;

removing at least portions of the second layer to extend the patterned features to the first layer; and

removing at least portions of the first layer to extend the patterned features to the substrate;

wherein the first layer and the second layer may be exposed to an etching process that undercuts the patterned features, and the first material may be lifted-off.

2. The method of claim 1 wherein the etching process causes etching of the first material and no etching of the second material.

3. The method of claim 1 method wherein the etching process causes etching of the first material and etching of the second material at a slower rate than a rate at which the first material is etched.

4. The method of claim 1 wherein the second layer does not intermix with the first layer.

5. The method of claim 1 wherein the step of removing at least portions of the second layer comprises dry etching.

6. The method of claim 1 wherein the step of removing at least portions of the first layer to extend the patterned features to the substrate does not remove second material.

7. The method of claim 1 wherein the first layer and the second layer are selectively etchable.

8. The method of claim 7 wherein the second layer comprises a silicon-containing material and the first layer comprises a non-silicon containing material.

9. The method of claim 8 wherein the step of removing at least portions of the second layer to extend the patterned features to the first layer comprises an anisotropic halogen etch.

10. The method of claim 9 wherein the anisotropic halogen etch is anisotropic halogen reactive ion etch comprising a fluorine-containing precursor.

11. The method of claim 8 wherein the step of removing at least portions of the first layer to extend the patterned features to the substrate comprises an oxygen plasma etch.

12. The method of claim 1 wherein step of forming the second layer comprises dispensing an acrylic-based polymerizable fluid.

13. The method of claim 12 wherein the acrylic-based polymerizable fluid includes (a) isobornyl acrylate; (b) n-hexyl acrylate; (c) ethylene glycol diacrylate; and (d) 2-hydroxy-2-methyl-1-phenyl-propan-1-one.

14. The method of claim 13 wherein the acrylic-based polymerizable fluid further includes a surfactant.

15. The method of claim 12 wherein the acrylic-based polymerizable fluid includes (a) isobornyl acrylate; (b) acryloxymethyltrimethylsilane; (c) (3-acryloxypropyltristrimethylsiloxysilane; (d) ethylene glycol diacrylate; and (f) a UV photoinitiator.

16. The method of claim 15 wherein the acrylic-based polymerizable fluid further includes a surfactant.

17. The method of claim 15 wherein the UV initiator comprises 2-hydroxy-2-methyl-1-phenyl-propan-1-one.

18. The method of claim 1 wherein the step of forming the first layer comprises coating a polymer containing a poly(dimethylglutarimide) ("PMGI") structure.

19. The method of claim 18 wherein coating comprises spin coating.

20. The method of claim 1 wherein the step of forming the first layer comprises coating a high molecular weight polyhydroxystyrene.

21. The method of claim 1 wherein the first layer comprises the one layer and another layer of another

material disposed on the one layer, and the second layer does not intermix with the another layer.

22. The method of claim 21 wherein the etching process causes etching of the first material and no etching of the another material.

23. The method of claim 1 method wherein the etching process causes etching of the first material and etching of the another material at a slower rate than a rate at which the first material is etched.

24. The method of claim 21 wherein the another layer is a BARC layer.

25. A method for generating patterned features on a substrate that comprises:

forming on said substrate a stacked layer by cross-linking a region of said stacked layer through exposure to actinic radiation, with areas outside of said region defining a first sub-portion of said stacked layer, with said region defining a second sub-portion; and

etching said stacked layer so that a greater quantity of said first sub-portion is removed in a given unit of time than said second sub-portion.

26. The method as recited in claim 25 wherein etching further includes providing said stacked layer with a re-entrant shape.

27. The method of claim 26 wherein etching further includes etching the second sub-portion at a slower rate than a rate at which the first sub-portion is etched.

28. The method as recited in claim 27 wherein forming further includes depositing said second sub-portion as a liquid material on said first sub-portion and spreading said liquid material over said first sub-portion while avoiding intermixing of said liquid material with said first sub-portion.

29. The method of claim 25 wherein the second sub-portion comprises a silicon-containing material and the first sub-portion comprises a non-silicon containing material.

30. The method of claim 25 wherein forming further includes dispensing an acrylic-based polymerizable fluid on said first sub-portion.

31. The method of claim 30 wherein the acrylic-based polymerizable fluid includes (a) isobornyl acrylate; (b) n-hexyl acrylate; (c) ethylene glycol diacrylate; and (d) 2-hydroxy-2-methyl-1-phenyl-propan-1-one.

32. The method of claim 31 wherein the acrylic-based polymerizable fluid further includes a surfactant.

33. The method of claim 30 wherein the acrylic-based polymerizable fluid includes (a) isobornyl acrylate; (b) acryloxymethyltrimethylsilane; (c) (3-acryloxypropyltristrimethylsiloxy)silane; (d) ethylene glycol diacrylate; and (f) a UV photoinitiator.

34. The method of claim 33 wherein the acrylic-based polymerizable fluid further includes a surfactant.

35. The method of claim 33 wherein the UV initiator comprises 2-hydroxy-2-methyl-1-phenyl-propan-1-one.

36. The method of claim 25 wherein forming further includes dispensing on said substrate a polymer containing a poly(dimethylglutarimide) ("PMGI") structure.

37. The method of claim 36 wherein coating comprises spin coating.

38. The method of claim 25 wherein forming further includes dispensing upon said substrate a having high molecular weight polyhydroxystyrene.

39. A method for generating patterned features on a substrate that comprises:

forming on said substrate a stacked layer by cross-linking a region of said stacked layer through exposure to actinic radiation, with areas outside of said region defining a first sub-portion of said stacked layer, with said region defining a second sub-portion; and etching said stacked layer to form a via therein having a re-entrant shape.

40. The method as recited in claim 27 wherein forming further includes depositing said second sub-portion as a liquid material on said first sub-portion and spreading said liquid material over said first sub-portion while avoiding intermixing of said liquid material with said first sub-portion.

41. The method of claim 40 wherein forming further includes dispensing on said substrate a polymer containing a poly(dimethylglutarimide) ("PMGI") structure.

42. The method of claim 41 wherein coating comprises spin coating.

43. The method of claim 42 wherein the second sub-portion comprises a silicon-containing material and the first sub-portion comprises a non-silicon containing material.

44. The method of claim 42 wherein forming further includes dispensing an acrylic-based polymerizable fluid on said first sub-portion.

45. The method of claim 44 wherein the acrylic-based polymerizable fluid includes (a) isobornyl acrylate; (b) n-hexyl acrylate; (c) ethylene glycol diacrylate; and (d) 2-hydroxy-2-methyl-1-phenyl-propan-1-one.

46. The method of claim 45 wherein the acrylic-based polymerizable fluid further includes a surfactant.

47. The method of claim 42 wherein the acrylic-based polymerizable fluid includes (a) isobornyl acrylate; (b) acryloxymethyltrimethylsilane; (c) (3-acryloxypropyltristrimethylsiloxy)silane; (d) ethylene glycol diacrylate; and (f) a UV photoinitiator.

48. The method of claim 47 wherein the acrylic-based polymerizable fluid further includes a surfactant.